

**REMARKS**

Applicant respectfully requests that the holding of finality be withdrawn as per 27 CFR 1.114. Reconsideration of the rejections set forth in the Final Office Action dated 2/22/2006 is respectfully requested under the provisions of 37 CFR §1.111(b).

Claims 1-19 are pending.

Claims 1-19 stand rejected.

Claims 20-25 are newly added.

Claims 1, 7, and 13 have been amended.

Claims 1, 7, and 13 were amended responsive to the applicant becoming aware of a rejection from the European Patent Office related to European Patent Application EP 1 024 626 A1 (this reference had been provided in the IDS received by the USPTO on 4/14/05). These claims were amended to more clearly indicate that the wireless sensor and the provisioning device exchange their respective commitments over preferred channel(s). That is, that the wireless sensor sends its commitment to the provisioning device over the preferred channel and the provisioning device sends its commitment to the wireless sensor over the preferred channel. This is disclosed in the specification at least in paragraph [0065] that discusses establishing trust between the two devices; at paragraph [0067] that discusses the use of a location limited channel as the preferred channel and the exchange of commitments between the devices using the preferred channel; by paragraphs [0074]-[0076] that discusses the more detailed aspects of exchanging credentials; and by paragraph [0078] *discussing that the preferred channel is not a secure channel and that the commitments are sent in the clear*. In addition, these amendments are broadening amendments in that the preferred channel can comprise multiple uni-directional channels each having the demonstrative identification property and the authenticity property as well as a single bi-directional channel that has the demonstrative identification property and the authenticity property.

***I. Reply to the Response to Arguments from the Office Action***

The rational provided in the Response to Arguments section of the final office action indicates a high probability that the Examiner has misunderstood the invention as it was originally claimed. The current amendments to the independent claims are not directed to the rejection in the first office action or the remarks in the final office action.

The response to arguments section included,

"In contrast to the Applicant's argument, Lowensohn teaches and describes a method of detecting the presence of BARB Badges 100 in its vicinity and can relay the collected data via secure communication between the BARB badge and the computer-based system (fig.1, paragraph 0039, secure channel = preferred channel), automatically configuring the wireless device (paragraph 0042-0043, 0228), responsive to the provisioning, to communicate over a secure communication channel (fig.2, paragraph 0042-0043, the BARD badge 100 can securely communicate with the BARB base 110)."

*It is important to realize that the preferred channel (as that term is used by the inventor within the specification) does not require secrecy (that is, information sent on the preferred channel is not encrypted – the information is sent in the clear and an attacker can monitor transmissions on the preferred channel) so long as the attacker cannot transmit on the preferred channel without detection. Thus, the preferred channel does not require secrecy (see paragraphs [0054]-[0056]). Thus, Lowensohn's secure channel in paragraph [00039] is NOT equivalent to applicant's preferred channel. The Office Action makes a faulty association between the Lowensohn's secure channel and applicant's preferred channel.*

Applicant's response to the 102(e) Lowensohn rejection to the original claims is restated and expanded below. This response should be evaluated in light of the above discussion with the understanding that information sent across the preferred channel is sent in the clear and can be monitored by an attacker.

***II. Rejections under 35 USC §102(e)***

Claims 1-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Lowensohn et al. (U.S.Pub-20040230809).

A prima facie case of anticipation is established when the Examiner provides a single reference that teaches or enables each of the claimed elements (arranged as in the claim) expressly or inherently as interpreted by one of ordinary skill in the art.

Applicant respectfully traverses this rejection to the claims as a prima facie case of anticipation has not been established for the original claims with respect to Lowensohn.

Lowensohn teaches technology related to a wireless badge that can be provisioned using techniques that were well known at the time of the instant invention. For example, data to be stored in the badge "must be encrypted prior to writing to the BARB Badge 100 (and decrypted after reading from the BARB Badge 100)" (see: [0270], also see [0159], [0162], [0236], and [0238]). Applications that read this data from the badge must obtain the crypto key for that badge to access the data [0143], [0206], and [0236].

In addition, the badge can include on-board encryption capability ([0057], [0259]). However, Lowensohn does not provide any detail on how the on-board encryption capability securely receives its key other than paragraphs [0270]-[0271] that describe well known techniques for providing a Key using a secure channel (see: last sentence of paragraph [0271]).

Lowensohn recognizes the potential security problems with IR and RF transmissions and teaches using a strong encryption algorithm for these transmissions [0057].

Lowensohn's badges are recognized by base stations that obtain the encrypted data from the badge and makes this encrypted data available to system applications. The system applications must first obtain a key to decode the encrypted data received from the badge to perform the application's function.

Lowensohn does not teach the use of a preferred channel as is claimed by the original independent claims of the instant application. **Lowensohn does not teach the provisioning of a wireless device over a preferred channel (as one skilled in the art would read the claim in light of the specification), or of automatically configuring**

the wireless device, responsive to the provisioning, to communicate over a secure communication channel. Applicant believes this will become clear from the following discussion.

### **Summary of the technology disclosed by the instant application**

One problem addressed by the claimed invention simplifies the incredibly difficult and complex creation and management of PKIs and distribution of certificates. This cost of setting up a PKI keeps individuals from considering larger-scale use of public key cryptography in embedded devices (e.g. cell phones, printers, etc), as each of these devices would have to be "provisioned" with a certificate before use. Furthermore, the key management and distribution problem described above in the PKI context exists with any secure credential infrastructure that uses a credential issuing authority to issue credentials. Furthermore, wireless networks have proved notoriously difficult for even knowledgeable corporate IT departments to securely configure. This has led to many deployed networks exposing information and network resources to strangers thus, leaving client machines vulnerable to attack. It is difficult, if not impossible, for network users to effectively configure and manage these wireless networks to make them secure. (See: [0011]-[0013]).

The claimed invention allows a device to obtain provisioning information from a provisioning device over a preferred channel and to automatically configure the device, responsive to the provisioning information received over the preferred channel, such that the provisioned device can send data over a secure communication channel. The provisioning can be (for example) providing a certificate, or parameters to setup a wireless device for secure transmissions.

The preferred channel is explained within the specification to use "a location-limited channel or any other channel that has both a demonstrative identification property and an authenticity property".

The preferred channel uses communication technologies that have inherent physical limitations on their transmissions (for example, short range communication, use

of visible light etc.). The *authenticity property* means that it is impossible or difficult for an attacker to transmit over the preferred channel or tamper with messages sent over the preferred channel without detection by the legitimate parties to the communication (attack detection only requires that the human participants know the number of the participants (devices) that are communicating over the preferred channel).

The *demonstrative identification property* of the preferred channel means that human operators are aware of which devices are communicating with each other over the preferred channel and that the human operators can easily detect when an attack is being made on the preferred channel.

*It is important to realize that the preferred channel does not require secrecy (that is, an attacker can monitor the transmissions on the preferred channel) so long as the attacker cannot transmit on the preferred channel without detection. Thus, the preferred channel does not require secrecy (see paragraphs [0054]-[0056]). Thus, Lowensohn's secure channel in paragraph [00039] is NOT equivalent to applicant's preferred channel.*

By using the preferred channel to pre-authenticate the keys (and to provide any provisioning information) that will be sent to the wireless sensor, the administrator of the secure credential infrastructure is assured that keys are only provided to wireless sensors that have had access to the preferred channel. Thus, establishing "trust" because the user of the wireless sensor must have had physical access to the preferred channel used by the provisioning device. Once "trust" is established, conventional security establishment techniques can be used to establish a secured channel with the wireless sensor. This allows the wireless sensor to communicate over a secure communication channel.

One example of the technology is that of providing simple administration of a PKI. If the provisioning device is within an access-controlled building, then a person who is able to obtain legal access to the provisioning device within the building is trusted. That trusted person can place their computer (or wireless sensor) in proximity to the provisioning device (where the preferred channel is a location limited channel), and have that computer (or wireless sensor) automatically provisioned for membership in the PKI.

# Analysis of the Claims in light of Lowensohn

Looking now to original independent claims 1, 7, and 13 (additional comments are provided related to the currently amended claim 1, 7, and 13 in Section III): The invention of original claim 1 is directed to a computer controlled method comprising:

establishing communication between a wireless sensor and a provisioning device over a preferred channel;

receiving provisioning information from said provisioning device over said preferred channel; and

automatically configuring said wireless sensor for transmitting sensor information over a secure communication channel responsive to said provisioning information.

Applicant admits that one skilled in the art at the time of the invention would understand the use of public and private keys, and PKI infrastructures.

As is well known, and as recently restated by US Court of Appeals for the Federal Circuit in *Phillips v. AWH Corporation* that was decided on July 12, 2005, the inventor can be his or her own lexicographer. The claims must be read in view of the specification, of which they are a part. The specification is the primary basis for construing the claims. The specification may reveal a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess. In such cases, the inventor's lexicography governs. The "ordinary meaning" of a claim term is its meaning to the ordinary artisan after reading the entire patent.

The preferred channel is explained within the specification to use "a location-limited channel or any other channel that has both a demonstrative identification property and an authenticity property" (see [0051]). The demonstrative identification property is described at paragraph [0052] and the authenticity property is described at paragraphs [0053] and [0054]. The consequence of the use of the preferred channel is described at paragraph [0055].

*Applicant believes it is likely the Examiner was not fully aware of the meaning of the term “preferred channel” as having both a demonstrative identification property and an authenticity property and that information sent across the preferred channel is sent in the clear.*

Nothing in Lowensohn teaches a “preferred channel” as that term would be understood by one skilled in the art after reading the entire patent. While Lowensohn uses location limited communication (IR and RF) technologies, these communications are not over a preferred channel. Communication is either completely secure (such as is the case where Lowensohn’s badges have encryption capability and the key for the secure communication has been provided using known technology), or the data communicated from the badge was encrypted prior to being stored in the badge. Nothing in Lowensohn teaches sending public information across an open channel that has the authenticity property and the demonstrative identification property. Lowensohn assumes that “trust” has already been established between the provisioning devices (by asserting that the badge has the capability to encrypt communications) or that no trust has been established (hence the need to encrypt the data stored on the badges).

The Office Action cited Lowensohn’s Fig. 1 and paragraph [0037] as teaching “establishing communication between a wireless sensor and a provisioning device over a preferred channel”. Fig. 1 and accompanying text teaches a badge in communication with a base station that communicates with a computer. The badge-base station communication being a **secure** IR or RF communication [0037]. The preferred channel of the instant invention is not a secure channel in that it does not require secrecy [0054]. That is, data is provided via the preferred channel and the information contained in the data can be monitored by an attacker. *Because Lowensohn’s IR and RF channels are secure, Lowensohn does not teach the preferred channel of the instant invention.*

The Office Action cited Lowensohn’s Fig.1, and paragraphs [0009]-[0010] and [0039]-[0040] as teaching “receiving provisioning information from said provisioning device over said preferred channel”. *The cited paragraphs all teach the use of secure communications or encrypted data between the badge and the badge-base station and/or computer-based system.* As discussed above, Lowensohn does not teach a

“preferred channel” as that term would be understood by one skilled in the art after reading the entire patent. *Thus, these references do not teach receiving provisioning information over the preferred channel.*

The Office Action cited Lowensohn's Figs.1 and 4, and paragraphs [0009]-[0010], [0059] as teaching “automatically configuring said wireless sensor for transmitting sensor information over a secure communication channel responsive to said provisioning information”. [0059] teaches use of a well known PKI for distributing credentials and determining “trust” between devices. This reference also does not teach the “preferred channel”. Nor does Lowensohn teach automatically configuring the wireless sensor responsive to the provisioning information provided over the location limited channel.

Thus, Lowensohn does not teach or enable each of the claimed elements (arranged as in the claim) expressly or inherently as interpreted by one of ordinary skill in the art. For this reason, Applicant respectfully traverses this rejection of **original claim 1**. Original independent claim 7 is a program product claim having scope similar to original claim 1. Original independent claim 13 is an apparatus claim having scope similar to original claim 1. Thus, for the previously presented reasons, Applicant respectfully traverses this rejection to **original claims 7 and 13**.

### ***III. Remarks related to art cited by the European Patent Office.***

While applicant has traversed the 102(e) Lowensohn rejections of the original claims, as previously mentioned, Claims 1, 7 and 13 have been amended in light of a rejection from the European patent office.

Original claims 1, 7, and 13 have been amended to add the limitation that establishing communication is configured to send a first commitment to the provisioning device over the preferred channel(s) and to receive a second commitment from the provisioning device over the preferred channel(s).

Thus currently amended claim 1 is a computer controlled method:

establishing communication between a wireless sensor and a provisioning device over at least one preferred channel, said wireless sensor configured to send a first commitment to said provisioning device over said at least one preferred channel and to receive a second commitment from said provisioning device over said at least one preferred channel;

receiving provisioning information from said provisioning device over said at least one preferred channel; and

automatically configuring said wireless sensor for transmitting sensor information over a secure communication channel responsive to said provisioning information.

These amendments were made to original claims 1 and 7, (and with similar scope to original claim 13) responsive to a European office action for the European companion case wherein the European Examiner asserts that the claimed invention is not new over Hermann (EP 1 024 626).

Hermann uses a unidirectional location-limited channel (the location-limited channel is used to send a public key – this channel is a preferred channel as that term is used in the instant application), and a wireless broadcast channel is used to provide the encrypted key (this channel is NOT a preferred channel). The invention of currently amended claim 1 uses at least one preferred channel to exchange commitments between the participating devices. These commitments are both sent in the clear and both are sent over channels that have the authenticity property and the demonstrative identification property (thus these channels are all preferred channels).

To demonstrate the difference between Hermann and the currently claimed invention:

Hermann's operation can be summarized as:

- Alice sends her public key to Bill over a preferred channel (the location limited channel).

- Bill shouts out, over a wireless broadcast media (this channel is not a preferred channel because it does not have both the authenticity property and the demonstrative identification property), his public key and an encryption key that is encrypted under Alice's public key.
- Alice (and anyone else) can receive Bill's shout. Alice can decrypt a portion of the shout using her private key to receive the encryption key provided by Bill.

The invention of currently amended claim 1 uses a preferred channel for Bill's communication where Hermann's technology does not.

The wireless broadcast channel used by Hermann does not have both the authenticity property and the demonstrative identification property (and thus is not a preferred channel) because an attacker can transmit over the wireless channel or tamper with messages sent over the wireless channel without detection by the legitimate parties to the communication. While Hermann's technology will foil a passive attacker (that is, an attacker that just listens to the location limited channel and the broadcast channel), an active attacker has two attack modes that can be successful against Hermann. These are:

1. An active attacker in a wireless broadcast channel can attack by impersonating the target device (Bill). Thus, the attacker also shouts (both the attacker and Bill shout) and then Alice cannot be sure that the received shout was from Bill (as it could be from the attacker). Alice's subsequent "secure" communications could be to the attacker and not to Bill. Thus, the attacker can capture information sent by Alice, but is unable to capture the information sent from Bill. This means that the attacker can, for example, capture account numbers, passwords etc., but not capture the information sent by Bill.
2. An active attacker can perform a classic man-in-the-middle attack on the location limited channel. To implement this attack, when Alice sends her public key to Bill over the location limited channel, the attacker also receives the Alice's public key and sends the attacker's public key to Bill over the location limited channel. If Bill accepts that attacker's public key

instead of Alice's public key, and shouts his public key and an encryption key that is encrypted under the attacker's public key, the attacker can recover Bill's encryption key, encrypt Bill's encryption key with Alice's public key and shout it out over the broadcast channel. Alice receives the attacker's message and uses her private key to receive the encryption key provided by the attacker. At this point, the attacker can monitor every communication between Alice and Bill as both Alice and Bill believe they are talking to each other, both Alice and Bill are communicating with the attacker who decrypts each message, can copy the message, and re-encrypts the message.

These attacks will not be successful against the instant invention because attacks on communications by Bill over a preferred channel will be detected and the instant invention uses a preferred channel to exchange commitments.

Because Hermann only uses a preferred channel for one of the communications (Alice to Bill, but not Bill to Alice) instead of both communications as does the instant invention (where a preferred channel is used when exchanging commitments both by Alice to Bill and by Bill to Alice), Hermann cannot anticipate currently amended Claim 1. Currently amended Claims 7 and 13 are similar in scope cannot be anticipated for similar reasons.

Since all rejections, objections and requirements contained in the outstanding official action have been fully answered or traversed and shown to be inapplicable to the present claims, it is respectfully submitted that reconsideration is now in order under the provisions of 37 CFR §1.111(b) and such reconsideration is respectfully requested. Upon reconsideration, it is also respectfully submitted that this application is in condition for allowance and such action is therefore respectfully requested.

The undersigned Xerox Corporation attorney hereby authorizes the charging of any necessary fees, other than the issue fee, to Xerox Corporation Deposit Account No. 24-0025. This also constitutes a request for any needed extension of time and

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authorization to charge all fees therefor to Xerox Corporation Deposit Account No. 24-0025.

Should any additional issues remain, or if I can be of any additional assistance, please do not hesitate to contact me at (650) 812-4259.

Respectfully submitted,

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